Copeland Scroll™

IZSI condensing unit for refrigeration applications

User Manual

Copeland Scroll™

EMERSON™
Climate Technologies

Pioneering Technologies For Best-In-Class Products

Emerson Climate Technologies is the world's leading provider of heating, ventilation, air-conditioning and refrigeration solutions for residential, commercial, and industrial applications. Leveraging a vast global network of sales, engineering, and manufacturing, Emerson™ has positioned itself to continue delivering the HVACR industry with advanced technologies and solutions along with superior technical support and training services.

For more than 80 years, Emerson has been introducing innovative technologies and solutions to the HVACR market. From the first semi-hermetic and hermetic compressors in the 1940s and 1950s, to the high efficiency Discus™ semi-hermetic and Copeland Scroll™ compressors of the 1980s and 1990s, Emerson has been the pioneer of the industry. Today, Emerson continues to build upon that success with new products such as the Copeland Scroll™ Fusion semi-hermetic scroll and Stream line-up of semi-hermetic reciprocating compressors, both equipped with CoreSense™ technology for optimal compressor protection and system diagnostics. Through this, Emerson has developed an unequalled range of solutions for the refrigeration, heating, and air conditioning markets.

Our Vision:

Emerson Climate Technologies, With Our Partners,
Will Provide Global Solutions To Improve Human Comfort,
Safeguard Food And Protect The Environment.

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Safety Information

Thank you for purchasing the IZSI Copeland Scroll™ indoor condensing unit. We hope that this product meets your refrigeration needs efficiently and effectively.

Please read through this User Manual thoroughly to familiarize yourself with the installation and commissioning process of this product and how to use it. Please do read the following information in this page before proceeding with the rest of the manual.

The Emerson™ medium/low temperature refrigeration condensing units should only be installed by suitably qualified and experienced refrigeration technicians. No responsibility can be accepted for damage caused by inexperienced or inadequately trained site technicians or improper system design. All instructions and procedures described in this manual are based on good refrigeration trade practices as applicable to this particular product. The installation contractor may prefer to use variations to these recommendations. However, the methods described in this manual represent the minimum requirements to avoid any subsequent warranty claims for this equipment and its components. These instructions do not cover the fundamentals of good electrical or refrigeration practice and are therefore intended for use only by qualified and/or experienced personnel or technicians.

These instructions are general in nature for this family of products and due to our policy of continuous improvement, some of the details may not apply to the unit you are installing. If in doubt, please consult your local sales office, quoting unit model, and serial number as shown on the nameplate. In case of ambiguity, the wiring diagram supplied with each unit takes precedence over the diagram in this manual.

Important:
The information contained in this manual is critical to the correct operation and maintenance of the condensing unit and should be read by all persons responsible for the installation, commissioning, and maintenance of this unit.

Safety
The equipment has been designed and manufactured to meet international safety standards but, like any mechanical/electrical equipment, care must be taken if you are to obtain the best results.

⚠ Caution

1. Service and maintenance of this unit, that is, Electrical and Mechanical in nature should be carried out by technically trained and competent personnel. They should be familiar with Local Standards and Codes of Practice.
2. When carrying out unit maintenance, ensure that the equipment is disconnected from the electrical power supply.
3. Refrigerant used in this unit is classified under the COSHH regulations as an irritant, with set Occupational Exposure Levels (OEL) for consideration if installed in confined or poorly ventilated areas.

Nomenclature

I	Z	S	I	0	6	A	E	-	P	F	Z	-	3	0	0
I = Indoor Type CDU	Z = Scroll C = CR S = S/H K = FHP	S = Wide Operating Range	I = Liquid Injection V = Vapor D = Digital N = None	Compressor Nominal Capacity (Btu/hr) at 60Hz Rating Condition		Chassis Type	Blank = Mineral Oil E = POE Oil		PFZ = 220–240V 1 Ph–50 Hz TFM = 380–420V 3 Ph–50Hz				Bill of Material		
Condensing Series	Compressor Type	Operating Range		Nominal Capacity (Btu/hr)			Oil Charged								
Base Model									Electrical Code				BOM		

The IZSI series indoor type scroll condensing units cover the range of 2 HP to 6 HP. The range is available with many refrigerant options and is suitable for a wide range of low and medium temperature applications like freezer room and medium temperature cold room/showcase applications.

Bill of Material

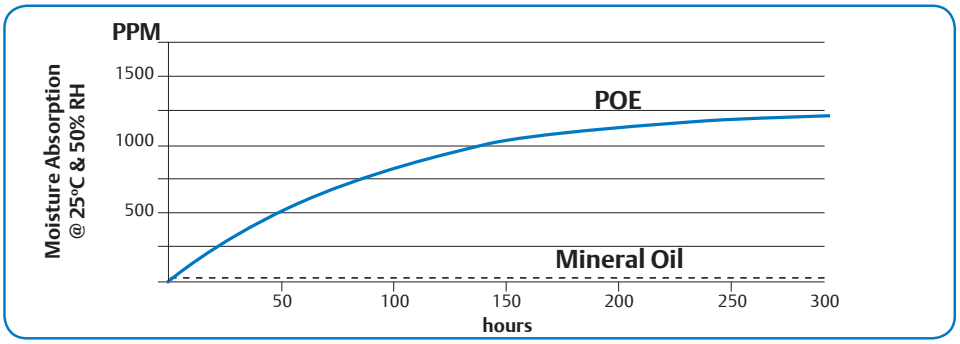
Standard BOM Content	BOM				
	300	301*	302*	303*	304*
CoreSense™	✓	✓	✓	✓	✓
Electrical Box	✓	✓	✓	✓	✓
Crank Case Heater	✓	✓	✓	✓	✓
Solenoid Valve	✓	✓	✓	✓	✓
Filter Drier – Flare Connection	✓	✓	✓	✓	✓
Moisture Indicator / Sight Glass	✓	✓	✓	✓	✓
Dual Pressure Switch	✓	✓	✓	✓	✓
Receiver with Valve	✓	✓	✓	✓	✓
Accumulator			✓	✓	
Oil Separator			✓		✓
Fan Motor	✓	✓	✓	✓	✓
Heat Exchanger	✓	✓	✓	✓	✓
Compressor with Stub Tube	✓		✓	✓	✓
Canopy Enclosure			✓		
Compressor with Rotalock Connections		✓			

* To be released in the future

Refrigerants

The range is designed for various refrigerants including R22, R404A and R134a. Contact your local sales or Application Engineer for more information.

Absorption of Moisture



Since POE holds moisture more readily than mineral oil, it is more difficult to remove it through the use of a vacuum. Condensing units supplied by Emerson Climate Technologies contain oil with low moisture content, and this may rise during the system assembling process. POE oil should not be exposed to the atmosphere longer than 15 minutes. A filter drier is installed to help maintain moisture level in the oil less than 50 ppm. If oil is charged into a system, it is recommended to use POE with a moisture content no higher than 50 ppm.

Receiving Your Unit

All units are shipped with a holding charge of dry nitrogen at a low but positive pressure. Suitable labeling is prominently displayed on the unit. Two Schraeder type connections are provided for checking the integrity of the holding charge.

⚠ **Caution!** It is very important to check that this holding pressure exists at the time you receive each unit from your supplier.

If, after checking, you find the holding charge non-existent or low, you should immediately inform your supplier. Failure to do so could void your claim for other related system faults at a later period. Transit damage is essentially an insurance claim and not covered under warranty. It is also advisable to inspect the rest of the unit for obvious physical damage and inform your supplier in case any is discovered.

Standard Features

Wide Operating Envelope for Various Applications

Efficient and Quiet – Key Scroll Attributes

Low Applied Cost – Factory Built

Simple and Reliable – Powered by Copeland Scroll™ with CoreSense™

Condenser

Large surface area coil ideally positioned to optimize airflow and heat transfer. Axial fan assembly with finger proof grille and incorporating an external rotor motor, offering maximum performance while keeping sound levels to a minimum.

ZSI Scroll Compressors are comprised of:

- Internal motor protection
- Internal pressure relief valve
- Oil sight glass
- Sump heater

The compressors are mounted to the base plate with the use of vibration reducing grommets.

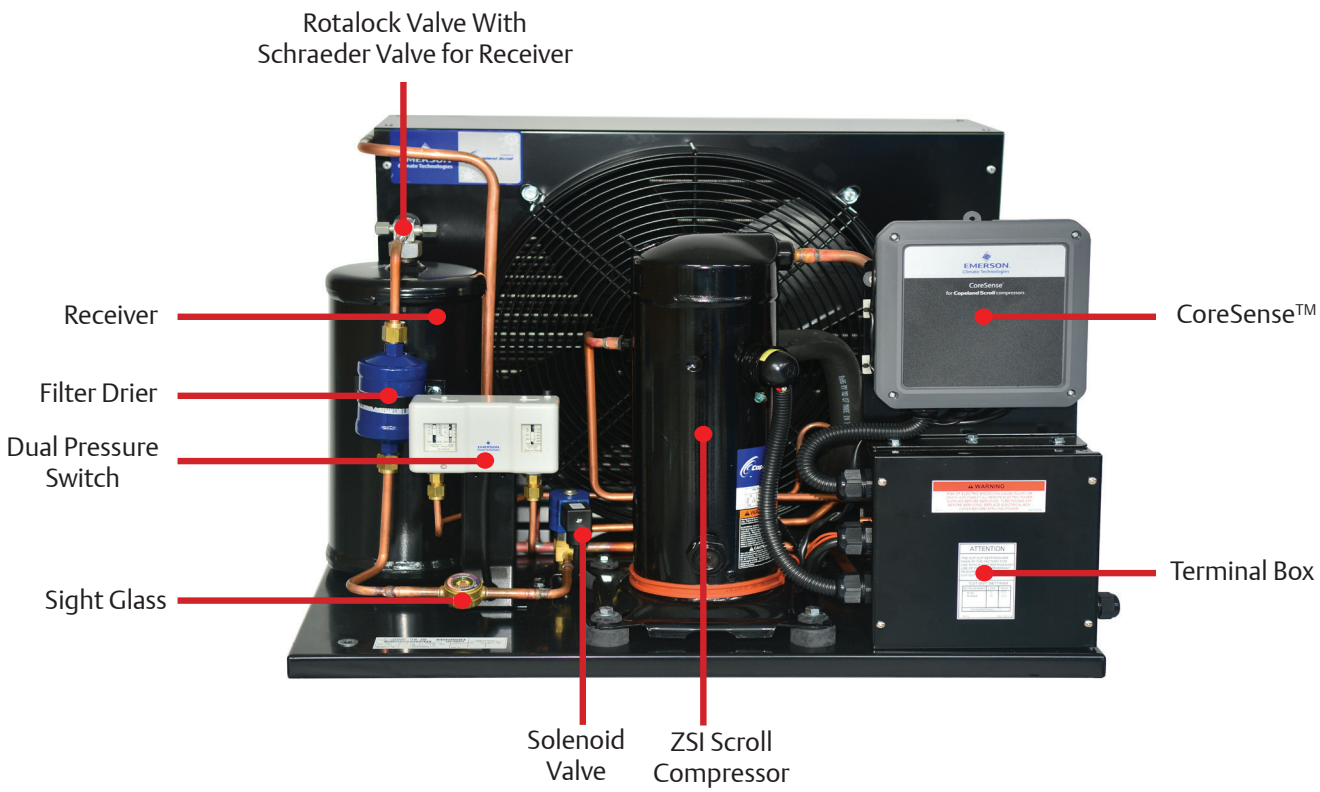
The refrigeration circuit is supplied with the following:

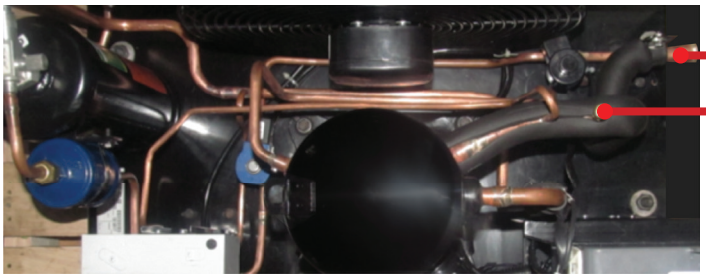
- Suction and Liquid Line Charging / Pressure Valve
- Low Pressure and High Pressure cut out with manual reset
- CoreSense™ Injection Controller
  - The CoreSense™ controller, drives the injection EXV and features:
    - > PD Control to Avoid Overheating and Optimal Compressor Operation
    - > High Discharge Line Temperature Protection
    - > Self Diagnostic Sensor Failure
    - > LEDs for Hardware Check
    - > Alarm Contact

Electrical

The electrical box construction complies with IP54 weatherproof construction. An electrical contactor and push type connectors are provided.

Physical Layout of the Unit





Dimensions and Installation Guidelines

Table below shows overall dimension of the units.

CDU Models	HP	Chassis WxDxH (mm)	
		Single Fan	Dual Fan
IZSI06A	2.0	716 x 538 x 470	–
IZSI06AE			
IZSI08A	2.5		
IZSI08AE			
IZSI09B	3.0	738 x 674 x 521	–
IZSI09BE			
IZSI11B	4.0		
IZSI11BE			
IZSI14C	4.5	738 x 674 x 572	–
IZSI14CE			
IZSI15C	5.0		
IZSI15CE			
IZSI18D	6.0	–	1045 x 679 x 557
IZSI18DE			

Unit Lifting

- If the unit is dropped, it should immediately be checked for damage.

⚠ **Caution!**

The unit should be lifted from the base and where possible, with all packing and protection in position.

The installation position should be selected with the following points in mind:

- Levelling should be +/- 5 mm.
- Observe airflow and maintenance clearances.
- Pipework and electrical connections are readily accessible.
- Where multiple units are installed, due care should be taken to avoid the discharge air from each unit adversely affecting other units in the vicinity.
- Ensure there are no obstructions in front of the condenser inlet.

Positioning

- Maintain distance between units to prevent air recirculation.

⚠ **Caution!** Prior to connecting power, ensure that the equipment is installed and level.

It is recommended to have a clearance of at least 500 mm between the condenser face and adjacent wall or unit.

Where multiple units are to be installed in the same location, the contractor needs to consider each individual case carefully. There can be many variations of unit quantities and available space and this manual does not cover all such possible options. In general terms, air recirculation and local heat build up should be avoided at all times.

⚠ **Caution!** The unit should never be installed adjacent to a dust source (Such as a dirty road or extractor fan). External contamination of the condenser fins lead to high condensing temperatures and will reduce the life of the unit.

Essential Service/Installation Tools, Equipment, and Materials

Before start-up, the technician needs to assemble the correct tools and equipment for the task. Apart from the normal refrigeration service technician tools, electrical test equipment, and hand tools, the following items are essential for the installation of hermetic refrigeration systems:

Vacuum Pump of sufficient size for the total refrigeration system and capable of pulling a vacuum of at least 100 μmHg (microns) or 13 Pa. This pump should be fitted with a proper vacuum breaker valve in the event that it loses power supply during the evacuation process.

A Four Port Charging Manifold includes:

- A 3/8" hose to vacuum pump
- All hoses fitted with removable Schraeder depressors
- One compound and one pressure gauge

All equipment should be leak-free, accurate, and reliable.

Clean and sufficient nitrogen gas for leak testing. Clean and new refrigerant gas of sufficient quantity for charging.

Note: Refrigerant cylinders must be the type that can deliver liquid refrigerant until empty.

Oxygen-free Nitrogen and regulators.

Reliable Electronic Vacuum Gauge. A clean and leak-free refrigeration system can only be assured if the initial vacuum is deep and holds on test. This equipment must meet the standards indicated in the recommended start-up procedures.

Clean and new compressor oil.

- **Mineral Oil** is charged in R22 units
- **POE Oil** is charged in R404 units

  If the recommended oil is not available in your area, contact your nearest distributor/wholesaler for acceptable alternatives.

Thermometer to measure discharge temperature and suction temperature.

Electronic Leak Detector.

Tubing Installation

- Proper line sizes are necessary for good oil return
  - Need to maintain minimum gas velocities

The compressor oil is constantly pumped through the liquid line, evaporator coil, and back through the suction line in normal system operation.

Please follow the guidelines listed below to ensure proper lubrication of the compressor by avoiding oil accumulation at undesirable points in the system.

1. No traps in the suction line are necessary if the condensing unit is level with the indoor evaporator coil or the indoor evaporator coil is 1.2 m or less lower than the outdoor condensing unit.
2. A trap is necessary in the suction line at the indoor evaporator coil if the indoor evaporator coil is more than 1.2 meter below the outdoor condensing unit.

Electrical Installation

All wiring must conform to the provisions of local codes, or in the absence of local codes, an equivalent type wire/contactor or connectors must be used if any of the originals supplied with the unit needs to be replaced.

A reference table is shown below for unit electrical characteristics. Provide proper power supply to the unit through a circuit breaker or fused disconnect switch, in accordance with local codes.

Fuses should be sized according to local regulations but should not be larger than indicated in the table

Models	Rated Voltage/ Hz	RLA	Max. Operating Current	LRA	Contactor Rating	Min. Circuit Ampacity	Max. Fuse
IZSI06A-PFZ	220V - 240V 50Hz	11.5	12.3	56.6	22.0	13.9	25.0
IZSI06AE-PFZ	220V - 240V 50Hz	13.5	13.6	56.6	22.0	16.4	30.0
IZSI08A-PFZ	220V - 240V 50Hz	12.4	13.1	71.5	22.0	15.1	30.0
IZSI08AE-PFZ	220V - 240V 50Hz	14.1	15.6	71.5	22.0	17.8	30.0
IZSI09B-TFM	380V - 420V 50Hz	6.2	6.2	39.2	21.0	7.7	15.0
IZSI09BE-TFM	380V - 420V 50Hz	6.8	6.7	39.2	21.0	8.5	15.0
IZSI11B-TFM	380V - 420V 50Hz	8.3	6.6	51.5	21.0	10.3	20.0
IZSI11BE-TFM	380V - 420V 50Hz	9.2	7.5	51.5	21.0	11.5	20.0
IZSI14C-TFM	380V - 420V 50Hz	9.0	8.2	51.5	21.0	11.2	20.0
IZSI14CE-TFM	380V - 420V 50Hz	9.8	9.2	51.5	21.0	12.2	25.0
IZSI15C-TFM	380V - 420V 50Hz	9.6	10.1	51.5	21.0	12.0	25.0
IZSI15CE-TFM	380V - 420V 50Hz	10.3	11.9	51.5	21.0	12.8	25.0
IZSI18D-TFM	380V - 420V 50Hz	11.8	11.2	74.0	21.0	13.3	25.0
IZSI18DE-TFM	380V - 420V 50Hz	13.0	13.7	74.0	21.0	14.8	30.0

Notes:

1. Use copper conductors only. All wiring must comply with local codes for wire sizes. Also, it is suggested that the next larger size wire be used when long runs in excess of 30 m. Refer to the following wiring diagrams when wiring or servicing.
2. R.L.A. = Rated Load Amps
3. L.R.A. = Compressor Locked Rotor Amps
4. In the event of fuse blowing, investigate the cause. Do not put in a larger fuse.
5. The name plate is located on the outside surface of the unit.
6. All units are in Ampheres

All installation and wiring must be performed by qualified personnel.

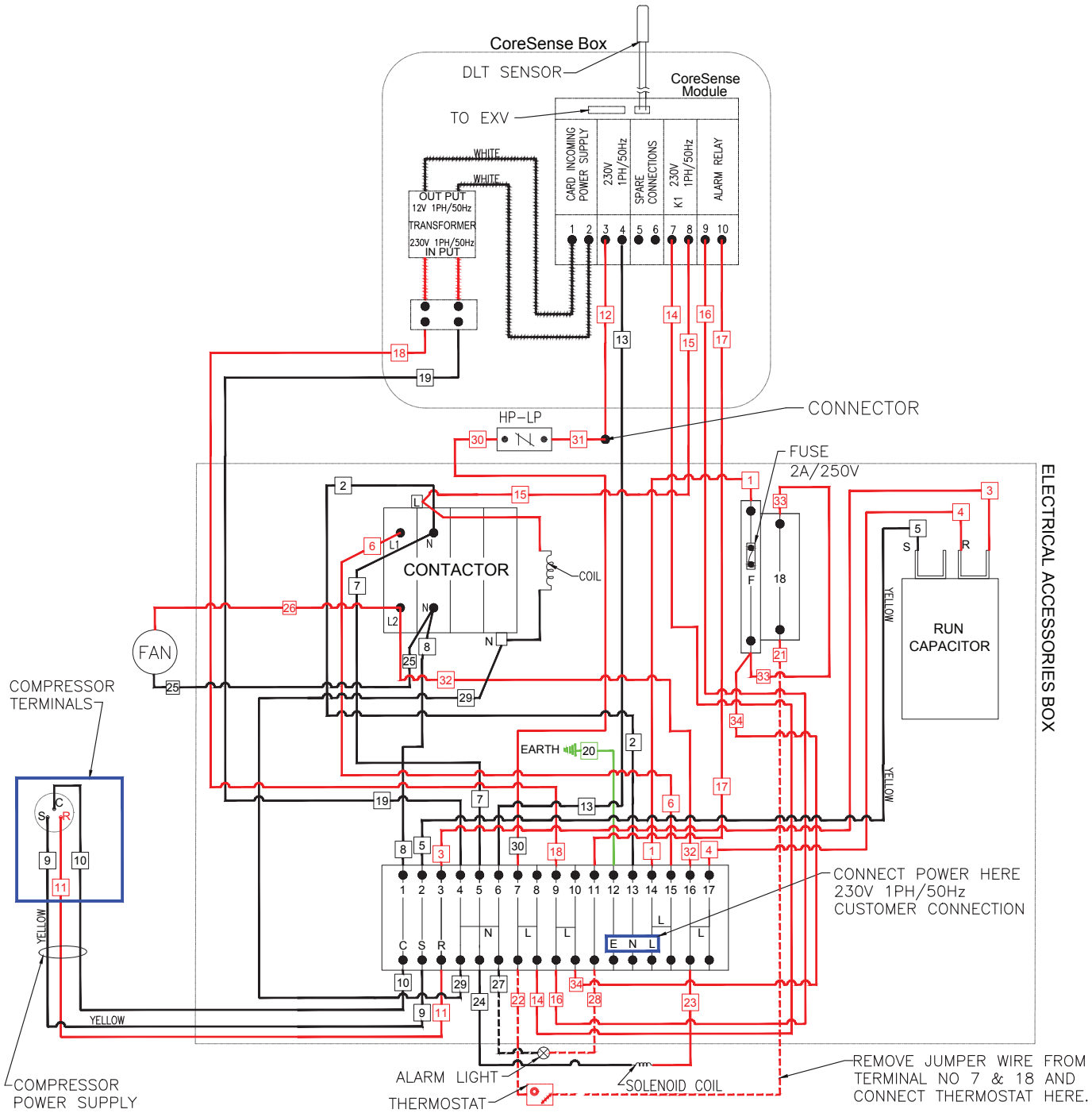
Notice: Before the unit is started, the following points must be checked by the installer and/or electrician:

1. Check every electrical connection of “PUSH-ON” or “SCREW-ON” type terminals to ensure these are secured tightly on their proper post.
2. Review wiring diagrams for proper routing.
3. All wiring must comply with local codes for wire sizes. Refer to the wiring diagrams when wiring or servicing.

A loose terminal will cause local overheating, deteriorating the insulation and causing electrical breakdown. This can lead to blown fuses, burned wires, burned contact points, and a premature compressor failure. Each electrical contact has been factory checked, however, connections may loosen up due to vibration in transit. Please be certain that all electrical connections are tight.

Wiring Diagram

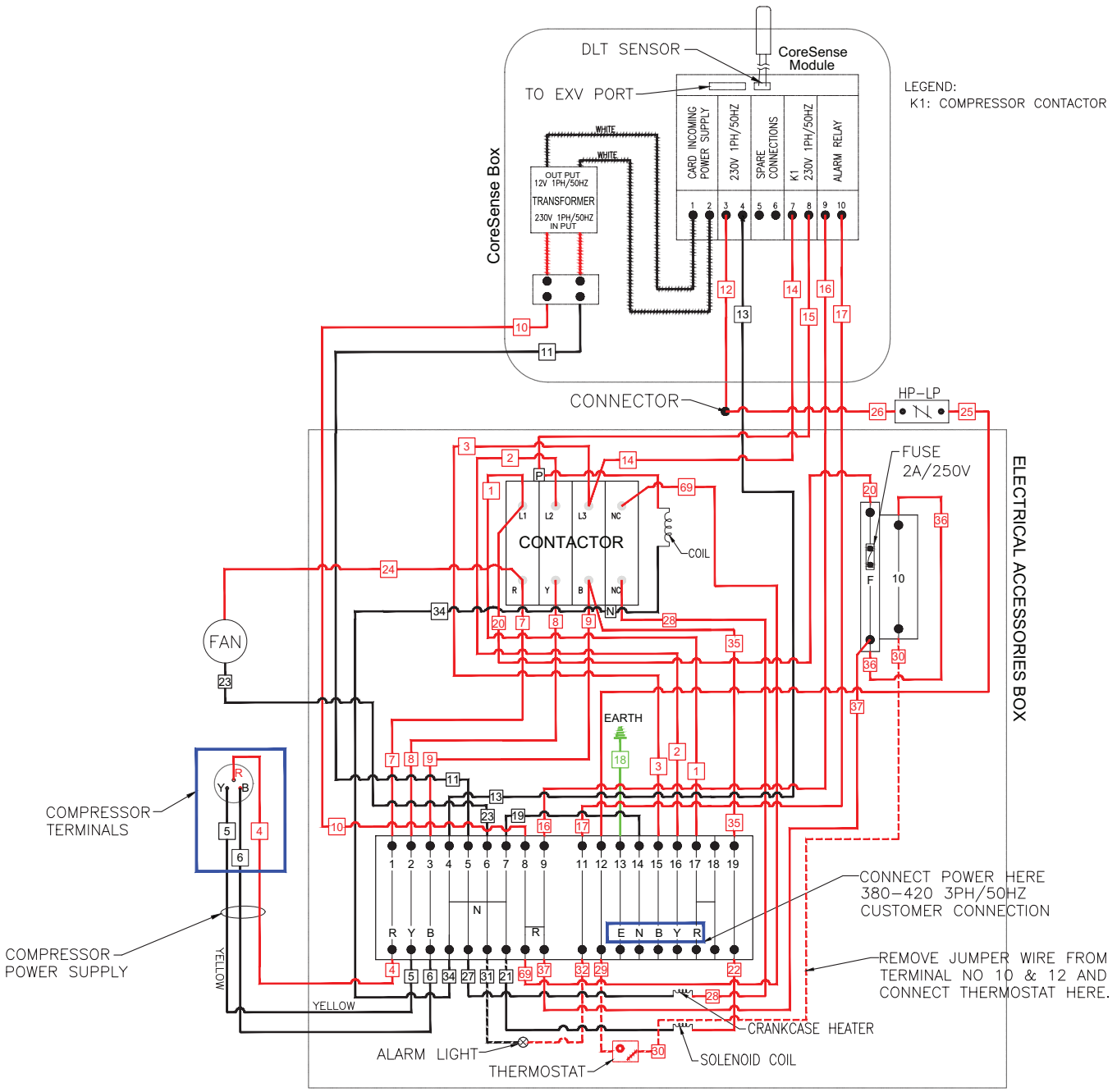
IZSI06A, IZSI08A, IZSI06AE, IZSI08AE



CONNECTIONS CHART	
FERRULE No. ON WIRES	USED FOR CONNECTING
23 24	TO SOLENOID COIL 230V 1PH/50Hz
21 22	TO THERMOSTAT
25 26	TO FAN
27 28	TO ALARM LIGHT
30 31	TO HP/LP
9 10 11	TO COMPRESSOR

Wiring Diagram

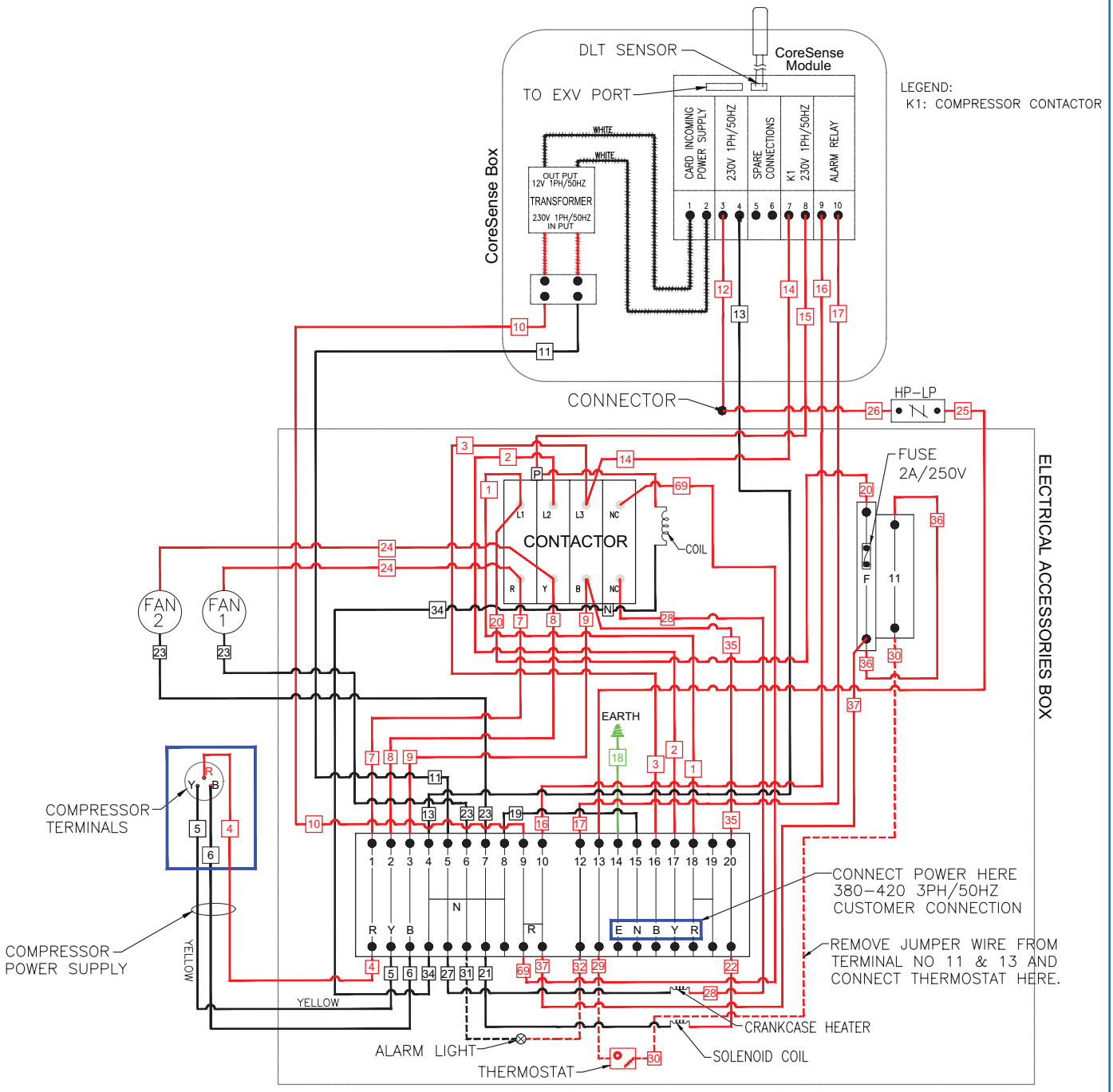
IZSI06A, IZSI08A, IZSI09B, IZSI11B, IZSI14C, IZSI15C
IZSI06AE, IZSI08AE, IZSI09BE, IZSI11BE, IZSI14CE, IZSI15CE



CONNECTIONS CHART	
FERRULES No. ON WIRES	FOR CONNECTING
21 22	TO SOLENOID COIL 230V 1PH/50Hz
29 30	TO THERMOSTAT
23 24	TO FAN
31 32	TO ALARM LIGHT
25 26	TO HP/LP
4 5 6	TO COMPRESSOR
27 28	CRANKCASE HEATER

Wiring Diagram

IZSI18D, IZSI18DE



CONNECTIONS CHART	
FERRULES No. ON WIRES	FOR CONNECTING
21 22	TO SOLENOID COIL 230V 1PH/50Hz
29 30	TO THERMOSTAT
23 24	TO FAN
31 32	TO ALARM LIGHT
25 26	TO HP/LP
4 5 6	TO COMPRESSOR
27 28	CRANKCASE HEATER

Pressure Cut Out Settings

Please ensure following setting for the cut outs for the safe operation of the unit:

Refrigerant	Maximum Condensing Temp.	LP		Minimum Evaporating Temp.	HP	
		Cut Out	Cut In		Cut Out	Cut In
R22	60°C	0.7 bar	2.4 bar	-30°C	25.5 bar	20.7 bar
R404A	60°C	1.0 bar	2.7 bar	-30°C	29.6 bar	24.1 bar
R134a	60°C	0 bar	1.7 bar	-30°C	17.2 bar	13.8 bar

CoreSense™ Controller

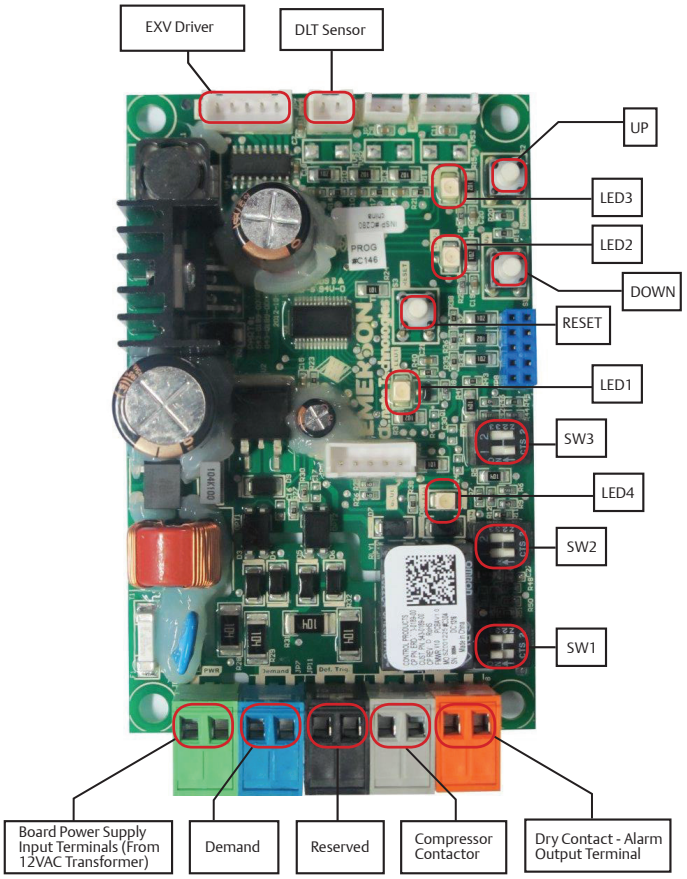
Function Description

The board will be used to turn the compressor on/off based on the demand signal from the thermostat.
The board will control Liquid Injection through an EXV based on a temperature sensor on the discharge tube.

Dipswitch Setting

- SW1 is used to control the liquid injection set point and cut out. Do not change settings and ensure that replacement board is set correctly
- SW2 and SW3 are not functional in IZSI units

Dipswitch	Factory Setting
SW1 bit1	OFF
SW1 bit2	OFF
SW2 and SW3	Not used



Board Operation - EXV Testing

Button	Function
Up	To operate EXV manually
Down	
Reset	Resets the board

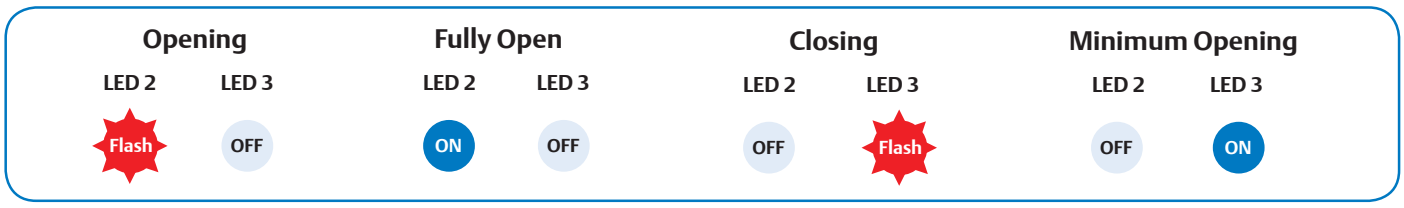
LED Display	Description
1 (Yellow Green)	LED Blinking Pattern Indicates DLT Sensor Status
2 (Yellow Green)	LED2 and LED3 Combination and Blinkng Patterns Indicate EXV Opening or Closing
3 (Yellow Green)	LED2 and LED3 Blink Once When Entering or Exiting EXV Manual Operation
4 (Red)	LED4 Turns On as an Alarm when Triggered by any of the following: 1) DLT overheat protection 2) DLT sensor open circuit 3) DLT sensor short circuit

Operation: Shift Between Auto Mode and Test Mode

- Push “Up” and “Down” together for 5 seconds to shift between Auto Mode and Test Mode
- LED2 and LED3 flashing together once means the shift is successful

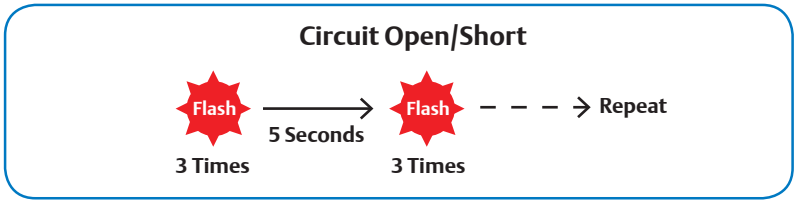
Operation: Operate EXV Manually

- Short Push (< 2s) “Up” or “Down” to open or close EXV by one step
- Long Push “Up” and “Down” to open and close EXV rapidly
- LED2 will flash when EXV is opening and will remain on when EXV is fully open
- LED3 will flash when EXV is closing and will remain on when EXV reaches minimum opening
- Push “Up” and “Down” together for 5 seconds to revert to Auto Mode
- Board will automatically revert to Auto operation after 10 minutes from last manual button push



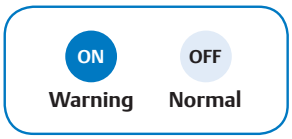
Diagnostic Function of the Board

LED1: Status Indicator of Discharge Line Temperature Sensor



LED4: Warning Signal

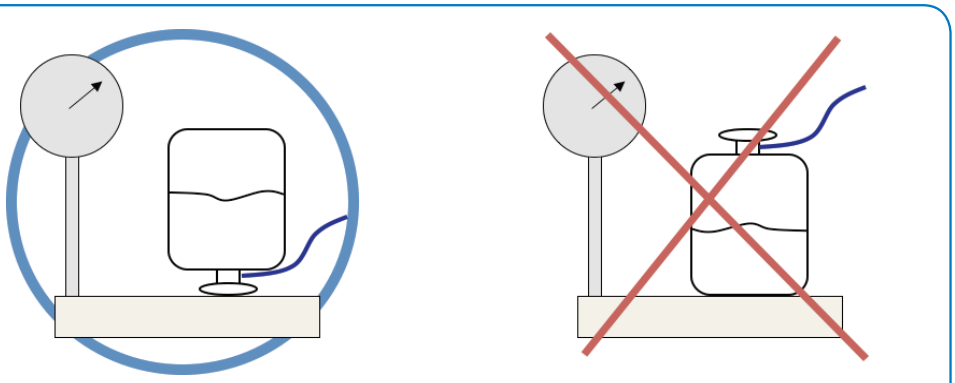
- Overheat Protection
- Sensor Failure, Circuit Open/Short



Initial Start Up of Condensing Unit

Utmost care must be taken while handling the scroll condensing unit. Please go through the contents below to ensure proper handling:

- Refrigerant Charging
  - Charge liquid into high side of system.
  - **DO NOT** vapor charge the system through the suction, otherwise compressor will overheat.
  - If top up is necessary, bleed some liquid refrigerant into low side when the compressor is running.



CAUTION: Low Side Vapor Charging will damage the scroll set

Application Tips for Scroll Compressors

- Do not use compressor to pull vacuum
- Never use the compressor to suck oil into the system
- Do not test compressor by closing suction valve
- Do not set low pressure switch below 0 bar
- Do not bypass LP controls
- Do not pump down below 0 bar
- Reverse Rotation
  - Scroll compressors pump in one direction only
  - Incorrect rotation can be identified by:
    > Low current, noise, balanced suction, and discharge pressure
  - Correct by interchanging any two phases
  - Short-term reverse rotation will not damage the compressor

Start-up Leak Test, Evacuation, and Charging

The following assumes the condensing unit to be leak-free on arrival. That is an important step before proceeding with the following.

Leak test is particularly important for field-connected systems. Typically, field systems lose as much as 20%–30% of their refrigeration charge annually. This is not only an unnecessary expense but also damages the environment. Compressor oil can be lost at the same time as refrigerant and eventually lead to compressor failure. (Time spent on leak test will eventually reduce the time spent on the evacuation process).

Ensure that all service valves are open during the leak test process. It is important to recheck all joints within the unit as well as the external joints.

Initial Pressure Test (by vacuum and nitrogen)

Step-by-Step:

1. Use a 4-port gauge manifold with 3/8" hose and connections to the vacuum pump. The vacuum gauge does not have to be connected for this part of the process.
2. Connect the gauges to service ports provided on receiver valve and suction tube.
   In order to remove any non-condensable that may have entered the system during installation, follow these steps:
   - Start the vacuum pump. The evaporator fan should be running and the compressor crankcase heater is energized at this point. This will involve powering up the unit so it is important to disconnect the live feed wire to the compressor contactor (so the compressor cannot run and the crankcase heaters can be energized).
3. Open both valves on the manifold and then open the main vacuum valve on the pump. Run the vacuum pump until the vacuum level is at around -0.85 bar (as read on the manifold gage) is achieved.
4. Shut off the main vacuum pump valve. Check for vacuum rise using the manifold compound gauge. A rise would indicate a large leak.
5. If vacuum holds for 10 minutes, break vacuum with nitrogen and pressurize to 20 bar. Check for leaks and repair leakage once detected.

Leak Test (by nitrogen pressure)

Release nitrogen from system. Start vacuum pump and open main pump valve.

Evacuation

Note that the following procedure is based upon achieving an actual system vacuum standard and it is **NOT TIME-DEPENDENT!**

Step-by-Step:

1. Check suction capability of the vacuum pump with a gauge before commencing evacuation process. The vacuum pump must be rated to achieve a vacuum level of at least 100μmHg (microns) or 13 Pa.
2. Connect the vacuum gauge to the system.
3. It is recommended to carry out the evacuation process three times as detailed below:
   Start the vacuum pump and then open the main valve. It is assumed that the crankcase heater still energized and the compressor cannot start.
   Caution: Ensure that the vacuum pump cannot be switched off during evacuation – otherwise the pump may lose its lubrication oil to the system and contaminate it. Therefore, the pump must have a Vacuum Breaker fitted to it.
   - Step 1 Evacuation: Evacuate to 1500 μmHg (microns) or 200 Pa and break vacuum to 0.1 bar with the nitrogen
   - Step 2 Evacuation: Same as in Step 1.
   - Step 3 Evacuation: Leave the pump running while checking the vacuum regularly.

The target system vacuum is 500 μmHg (microns) or 67 Pa.

- Once the target vacuum level is reached, the quality of the vacuum within the system must be tested. This is achieved by shutting off the main pump valve, allowing the internal system pressure to rise, and recording the time taken for the vacuum to rise by no more than 300 μmHg (microns) or 40 Pa within 30 minutes. (i.e. to 100 μmHg (microns) or 13.3 Pa). Evacuation is only complete once the vacuum quality is achieved. Close the pump main valve, switch off, and remove the vacuum pump.

Charging and Commissioning

Step-by-Step:

1. Ensure that there is no power supply to the unit. Hence, it is acceptable to leave the crankcase heater off.
2. Connect the refrigerant cylinder to main service hose and purge line at the manifold end.
3. Invert the refrigerant cylinder if necessary to ensure only liquid refrigerant can be charged into the system. This will be charged through the high pressure side of the manifold and liquid service valve.
4. The refrigerant cylinder should be weighed at this point to be able to record the final refrigerant charge. Refer to the table below for the approximate holding capacity of receiver at 32°C when it is 80% full.

	R22	R404A
IZSI06A(E)	2.3	1.9
IZSI08A(E)	2.3	1.9
IZSI09B(E)	6.4	5.5
IZSI11B(E)	6.4	5.5
IZSI14C(E)	6.4	5.5
IZSI15C(E)	6.4	5.5
IZSI18D(E)	8.3	7.2

5. Open the liquid service valve (off the back seat). In warm ambients, with a good vacuum in the system and the refrigerant cylinder inverted, it may not be necessary to run the compressor.
6. In cooler ambients, it may be necessary to run the compressor in order to complete charging.

   IMPORTANT! TO BE CLEARLY UNDERSTOOD PRIOR TO RUNNING ANY SCROLL COMPRESSOR!

   Scroll compressor systems should be charged as quickly as possible by bleeding liquid refrigerant into the suction line with the compressor running.

   ⚠ **DO NOT VAPOR CHARGE SCROLL CONDENSING UNITS SYSTEMS!**
7. The system needs to be operated down to its set point before you can be sure that the charge is correct. It is at this point that the normal refrigeration operational checks can be carried out-such as checking the liquid line sight-glass for bubbles and the operating pressures.
8. If the system is still short of refrigerant, bleed liquid refrigerant into the suction side with the compressor running.
9. Check the oil level and add oil if necessary.

Unit Operation

Before starting the unit, ensure the following:

- All the electrical connection are correct and as per the recommended wiring diagrams. All low side tubings are properly insulated.
- Leak check is done and unit is pre charged with refrigerant through high side.
- Check for superheat setting on the expansion valve (TXV) appropriate or not.

Adding refrigerant on a cold weather can result to an overcharged unit, which may then trip out on high pressure limit during warm weather.

Suction Superheat should be 10-15 K for reliable operation.

WARNING: Remember that the Refrigerant is under pressure. Always wear protective equipment, i.e. safety glasses or goggles and gloves when working with refrigerant, and guard against refrigerant spraying into the face or skin. Line pressures on an operating conditioning unit will vary with outdoor temperatures. As outdoor temperatures rise, pressures will also rise. See pressure temperature chart for system line pressures at different temperatures.

CAUTION: DO NOT, UNDER ANY CIRCUMSTANCES, HEAT THE REFRIGERANT CYLINDER WITH A TORCH OR BY ANY OTHER MEANS OTHER THAN WARM WATER. EXCESSIVE PRESSURES GENERATED IN THIS MANNER MAY WEAKEN THE REFRIGERANT CONTAINER AND RESULT TO A CYLINDER EXPLOSION!

Maintenance

Condenser Fins

Condenser fins become dirty over time as ambient air is induced to the condenser. Dirty coil surfaces result in high condensing temperatures and poor unit performance. Regular cleaning is recommended with frequency depending on the installation and the surrounding environment. As a general guide, it is advisable to do this at least **once every two months**.

Fins should be cleaned with liquid detergent diluted with clean water. Before washing, a light brush downward(in the direction of the fins) should be done to remove heavy deposits.

Electrical Connections

Check tightness of electrical connections occasionally.

Routine Leak Test

All joints should be checked for leaks during site visits. All joints should be leak tested once-a-year.

Condenser Fan(s) and Motor(s)

An annual inspection of these items is recommended. Fastenings may loosen, bearings may wear, and fans may require cleaning of solid deposits which can cause imbalance.

WARNING:
TURN OFF OR DISCONNECT THE ELECTRICAL POWER SOURCE BEFORE CLEANING THE CONDENSER COIL OR DOING MAINTENANCE.

General Information

Technical data are correct at the time of printing. Updates may occur, and should you need confirmation of a specific value, please contact Emerson Climate Technologies stating clearly the information required.

Emerson Climate Technologies cannot be held responsible for errors in capacities, dimensions, etc., stated herein. Products, specifications, and data in this literature are subject to change without notice.

The information given herein is based on data and tests which Emerson Climate Technologies believes to be reliable and which are in accordance with today's technical knowledge. It is intended for use by persons having the appropriate technical knowledge and skill, at their own discretion and risk. Our products are designed and adapted for fixed locations. For mobile applications, failures may occur.

The suitability for this has to be assured from the plant manufacturer, which may include making appropriate tests.

Note:

The components listed in this catalogue are not released for use with caustic, poisonous or flammable substances. Emerson Climate Technologies cannot be held responsible for any damage caused by using these substances.

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Asia 02 A01 10 – R00 Issued 04/2014 – GSCAA044
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